TITLE: Coastal land reclamation and erosion prevention system.

INVENTOR: Richard D. Stanley and Wilfred Toups

REFERENCES SITED: U.S. PATENT DOCUMENTS

5,011,327 4/1991 Thiac

5,178,489 1/1993 Suhayda

5,370,475 12,1994 LeBlanc

5,645,371 7/1997 Marzullo

5,820,295 10/1998 Buteaux

6,213,687 4/2001 Broughton et al.

6,375,387 4/2002 Gabor et al.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT:

No U.S. federal funds have been acquired or used in the research and development of this invention.

Attached: Five (5) ILLUSTRATIONS OF THE INVENTION

BACKGROUND OF INVENTION:

Previously referenced patents that are closely related to this application are primarily concerned with the reduction of erosive effects and describe the functionality of using vehicle tires to form various structural designs that have the capability of altering the way hydrodynamic forces act on coastal areas. They have described the loss of land masses and the need to prevent these losses. The structures, presented by the referenced prior art, are anchored to the seabed with a variety of anchorage devices, attached to pilings that allow pivotal movement not conducive to

soil retention, or are deployed in a widely scattered array that depends on its coverage mass for its positional stability. In the cases of Thiac, Patent #5,011,327, and Marzullo, Patent #5,645,371, the structures allow the possible accretion area to empty and fill with the tidal action which negates the accumulation process. In the case of Suhayda, Patent #5,178,489, the various structures sited sit on the seabed or are suspended on piling. Each of these forms allows the captured sediment to washout under and between the columns. In the case of LeBlanc, Patent #5,370,475, the area blanketed by the tire structure has a very limited area to allow reclaimed soil to accumulate. All of the aforementioned have not considered the subsurface current forces that will undermine the structures and cause channels to be formed that will generate higher velocity ebbing currents which will carry away sediment rather than allow the desired accretion to occur. The blanket style design would become massive when increased to a height that would be effective for reclamation and would create a large site unusable for recreational purposes as well as being an eyesore to the area.

BRIEF SUMMARY OF THE INVENTION:

The basic concept of this proposed invention is to provide a practical and economical system to reclaim land that has been lost to the erosion process and ensuring that it remains stable after reclamation. Additionally, this system will be upgradeable when looking to the predicted future ocean level increases caused by the internationally accepted global warming effects.

The research on vehicle tires that were naturally filled with their surrounding medium of sand, silt or mud, has shown that the tire had a virtual neutral buoyancy and a density that closely matched that of the medium in which it was located. This characteristic caused the tires to anchor the medium while still being flexible enough to track with the overall medium movement

generated by wave, current and tidal actions. With this knowledge, it was possible to engineer and deploy a structure capable of restraining the shoreside sediment that accumulated to the height of the structure. An overlapping interlocking tire structure provides the necessary strength and by partially burying the structure during the initial deployment, it becomes self anchoring and prevents seabed currents from undercutting the structure. Additional anchoring is used in coastal beach areas where severe storm, wave and tidal actions would be encountered. The structure will accept extensions both vertically and horizontally to increase the area of reclamation as well as adapting to variations or obstructions in the terrain. The system's capability of being installed in phases will minimize any negative effects to both beach access and landscape appearance.

DETAILED DESCRIPTION OF THE INVENTION:

The invention would use vehicle tires that have unbroken tread and sidewall areas ensuring that the tire is capable of retaining a filler material when the inner opening of the tire is closed and sealed. A purposely cut opening will be made at one point on the tire and a slurry sand/soil fill will be injected, after which the opening will be closed and sealed. Filled tires will be laid flat in a single continuous straight line with the tread areas touching. The tires will be secured to each other with a corrosion resistant strapping such as stainless steel. The layer of tires formed by this process becomes one of several layers necessary to form the invention structure. The tire layers are stacked vertically atop the lowest layer in an interlocking offset fashion where the strapped tire unions of alternate layers align vertically. Alternate layers are then vertically strapped together as depicted in Illustration 1. The structure is completed to the desired height and installed in a continuous open trench that extends the full length of the proposed reclamation area. The trench will have been excavated to a depth appropriate to provide sufficient positional

anchorage for the tire structure base as well as being at a depth unaffected by the natural seabed currents that could wash out under the structure. Screw type anchors would be installed on the shore side of the structure at thirty (30) foot intervals. The anchors will connect near the top of the structure and will be deployed at a forty five (45) degree angle to a point below the bottom of the structure. Additional anchors may be deployed on the sea side of the structure in coastal areas having more severe weather conditions.

ILLUSTRATION NO. 1

A view of the system's structure, from shore side, depicting the multiple layers and the vertical strapping style to make the structure rugged. The strapping would be of a corrosion resistant material with a crimp type fastener for ease of installation. Placement in the installation ditch allows the lower layers to be submerged in the local soil medium. At that time, the screw type anchors would be deployed and attached to the structure. There is no limit to the horizontal distance to which the structure could be extended. Furthermore, the structure can be increased vertically by stacking and strapping additional layers atop the previously installed structure.

ILLUSTRATION NO. 2

An end view of a basic system structure as it would appear deployed in the installation ditch. The location depicted in this illustration is of a coastal beach type and could easily be extended vertically as shore side beach accretion occurred. Anchors in this instance are shown on both the shore as well as the sea side of the structure. This type application would be used in a locale that is prone to severe weather and the resultant wind, water and tidal effect.

ILLUSTRATION NO. 3

This view illustrates the use of twin structures that would promote the reclamation of a

larger area in a shorter amount of time. These structures would also retain dredged backfill in the case where immediate use was necessary.

ILLUSTRATION NO. 4

The process of filling the tires is accomplished by first closing the inner tire access area with screws as in Detail A, Tire #1, or with a durable and strong tape as in Detail B, Tire #3. A temporary access is cut in the sidewall area to allow a slurry of soil medium to be injected and the access closed with screws (Tire #2) or a strong tape (Tire #4). The tires are then strapped to each other in a continuous chain to form the individual layers.

ILLUSTRATION NO. 5

The filled tires are positioned side by side with tread areas touching and strapped to form the continuous chain layer. As the layer is generated to an accepted distance, additional layers may be started atop the previous layer and continue the process of forming the overall structure as depicted in Illustration No. 1.